## Claims

sub 91 [c1] A carrier substrate comprising:
a plurality of first solder members having a first solder dimension and a first melting temperature disposed on the carrier substrate; and
a plurality of second members having a second member dimension and a second melting temperature disposed on the carrier substrate in a corresponding relationship to the first plurality of solder members, wherein the first solder dimension is greater than the second member dimension and the second melting temperature is greater than the first melting temperature and the second members are capable of being dispensed from a solder dispensing machine.

[c2] The carrier substrate of claim 1 wherein the plurality of first solder members and the plurality of second solder members are disposed on a bottom surface of the carrier substrate.

[c3] The carrier substrate of claim 2 further comprising:
an integrated circuit disposed on the bottom surface of the carrier substrate.

[c4] The carrier substrate of claim 3 wherein the carrier substrate is capable of being soldered to a printed circuit board and the plurality of second members define a minimum distance between the printed circuit board and the integrated circuit.

[c5] The carrier substrate of claim 2 further comprising at least one heat sink disposed on a top surface of the carrier substrate.

[c6] The carrier substrate of claim 1 wherein the plurality of second members includes an outer layer of a solder material having the first melting temperature.

[c7] The carrier substrate of claim 1 wherein the first solder member is composed of a lead tin eutectic alloy.

[c8] An integrated circuit comprising:
a carrier substrate; and
a solder ball array disposed on a bottom side of the carrier substrate, the solder ball array comprising:

a plurality of first solder balls composed of a first material having a first melting temperature, the plurality of first solder balls; and a plurality of second solder balls composed of a second material having a second melting temperature which is greater than the first melting temperature.

[c9] The integrated circuit of claim 8wherein the plurality of first solder balls have a first dimension and the plurality of second solder balls have a second dimension such that when heat having a temperate greater than or equal to the first melting temperature, but less than the second melting temperature, is applied to the solder ball array, only the plurality of first solder balls are melted

[c10] The integrated circuit of claim 9 further comprising an appication specific integrated circuit disposed on the bottom side of the carrier substrate.

[c11] The integrated circuit of claim 8 wherein the integrated circuit is capable of being soldered to a printed circuit board, and the plurality of second solder balls define an air gap between the printed circuit board and the application specific integrated circuit.

[c12] The integrated circuit of claim 8 further comprising:
at least one heat sink disposed on a top surface of the carrier substrate.

[c13] The integrated circuit of claim 8 wherein each of the plurality of second solder balls further include an outer layer composed of the first material.

[c14] The packaged processing chip of claim 13 wherein when heat having a temperate greater than or equal to the first melting temperature but less than the second melting temperature, is applied to the solder ball array, only the plurality of first solder balls and the outer layer of each of the plurality of second solder balls are melted.

[c15]
An integrated circuit comprising:
a carrier substrate having a bottom surface;
a printed circuit board having a top surface; and
a solder ball array coupling the bottom surface of the carrier substrate to the top surface of the printed circuit board, the solder ball array comprising

a plurality of first solder balls composed of a first material having a first diameter and a first melting temperature; and
a plurality of second solder balls composed of a second material having a second diameter and a second melting temperature.

[c16] The integrated circuit of claim 15 such that when a heat having a temperature greater than or equal to the first melting temperature but less then the second melting temperature is applied, the plurality of first solder balls create a plurality of solder joints between the first surface and the second surface and the plurality of second solder balls define a minimum distance between the carrier substrate and the printed circuit board.

[c17] The integrated circuit of claim 16 wherein the substrate further includes an application specific integrated circuit disposed on the bottom surface of the carrier substrate and wherein the minimum dimension is defined between the application specific integrated circuit and the printed circuit board.

[c18] The integrated circuit of claim 15 wherein the carrier substrate further includes at least one heat sink disposed on a top surface of the carrier substrate.

[c19] The integrated circuit of claim 15 wherein each of the plurality of second solder balls further include an outer layer composed of the first material.

[c20] The integrated circuit of claim 19 wherein the plurality of second solder balls further create a control solder joint when the heat having a temperature greater than or equal to the first melting temperature but less then the second melting temperature is applied, wherein the control solder joint includes a melted outer layer of first material and the second solder ball having the second diameter.

[c21] A method for making a solder member collapse system on a carrier substrate comprising:
applying a plurality of first solder members having a first dimension and a first melting temperature to a bottom surface of the carrier substrate; and
applying a plurality of second members having a second dimension and a second melting temperature to the bottom surface of the carrier substrate.

[c22] The method of claim 21 further comprising:
coupling an application specific integrated circuit to the bottom surface of the carrier substrate.

[c23] A method for making an integrated circuit comprising:
applying a plurality of first solder balls having a first dimension and a first melting temperature to a bottom surface of a carrier substrate;
applying a plurality of second solder balls having a second dimension and a second melting temperature to the bottom surface of the carrier substrate;
engaging the bottom surface of the carrier substrate with a top surface of a printed circuit board; and
applying a soldering heat having a temperature greater than or equal to the first melting temperature but less than the second melting temperature the carrier substrate and printed circuit board so that the plurality of first solder balls create a plurality of solder joints between the bottom surface and the top surface and the plurality of second solder balls define a minimum distance between the carrier substrate and the printed circuit board.

[c24] The method of claim 23 further comprising:
prior to engaging the bottom surface of the carrier substrate with the top surface of the printed circuit board, attaching an integrated circuit on the bottom surface of the carrier substrate, such that the minimum distance is disposed between the integrated circuit and the printed circuit board.

[c25] The method of claim 23 further comprising:
prior to engaging the bottom surface of the carrier substrate with the top surface of the printed circuit board, attaching at least one heat sink to a top surface of the carrier substrate.

[c26] The method of claim 23 wherein each of the plurality of second solder balls further include an outer layer composed of a material having the first melting temperature such that when the printed circuit board and the carrier substrate are heated, the plurality of second solder balls create a control solder joint, which includes a melted outer layer and the second solder ball having the second diameter.